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Fluoridation of Public Water Supplies and Its Effect on Dental Decay

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Fluoridation of public water supplies for the partial control of dental caries is receiving increasing attention in California. Although no fluoridation programs are yet in operation in this State, many communities are in various stages of planning and may soon take the necessary steps to get their projects under way.

This current crescendo in public interest has basis in the mounting and indisputable evidence of the beneficial influence of fluorides in protecting the teeth of children against dental caries. It has been proved conclusively that the consumption of water containing minute amounts of fluorides during the tooth formation years results in a high resistance to dental caries for the rest of the individual's life. Comparisons of findings in thousands of mouths from fluoride and nonfluoride areas show consistent reductions in caries experience among those children having the benefit of the optimum amount of fluoride. These reductions range from 40 percent up to 70 percent.

Research Findings

After more than five years of research in which fluorides have been added artificially to the water supplies of Grand Rapids, Michigan, and almost five years at Newburgh, New York; Brantford, Ontario; Marshall, Texas; Evanston, Illinois, and Sheboygan, Wisconsin, (1) it has been observed that the caries experience rates are comparable to those in areas where waters naturally contain similar amounts of fluorides. A comparative study in Aurora, Illinois, where the local water supply is naturally high in fluorides, showed about 60 percent less dental decay at all ages than was observed in Grand Rapids *before fluoridation.*

Even though research noted above dates back only to 1945, the experience of having fluorides in the water supply is certainly not new. It is estimated that more than 3,000,000 people in over 6,000 U. S. communities have been using water containing above 0.9 part per million of fluorides all their lives. (1) There is no evidence reported in the literature of concentrations near 1.0 p.p.m. causing any deleterious effect on human beings.

The greatest protection in the average climate accrues from using waters containing from 0.8 to 1.2 p.p.m., with little if any additional improvement in caries prevention above this point. This is one case in which there is no truth in the saying: "If a little is good, a whole lot ought to be better."

Tolerance Is Specific

Although water containing 0.8 to 1.2 p.p.m. is not toxic, the safe tolerance is rather specific. The dosage of fluorides added to public water supplies can be controlled well within the desired limits, but it is not considered safe to make one's own water solutions nor to try taking such fluoride in food. An overdose—i.e., in amounts equal to 2.0 p.p.m. and up, taken over periods of time, will cause what is known as "mottled enamel" or "fluorosed teeth." These teeth may still be highly resistant to dental caries, but they may have whitish-yellow or even dark brown markings which are objectionable in appearance.

Artificial Fluoride Treatment

Fluorine is one of the elements (in the halogen group, which also includes chlorine and iodine) which occurs in nature in several forms, but never in the free

state. It is found in teeth and bones. Two salts of this halogen, sodium fluoride and sodium silicofluoride, are common compounds used in artificial fluoridation of water.

Fluorides taken internally through foods and water benefit only children who are in the age group whose teeth are forming, i.e., from the prenatal period to about 10 years of age, but the benefits continue throughout life.

The beneficial effects of fluoridation of water with concentrations of 0.8 to 1.2 p.p.m. must not be confused with the effects of topical application of sodium fluoride by the dentist using a two percent solution under specific procedures. While benefits of topical application to older persons is still uncertain, application to children's teeth reduces caries incidence approximately 40 percent.

Endorsement of Fluoridation

Resolutions favoring the addition of fluorides to public water supplies have been adopted by national, state and local organizations. Among these are the American Dental Association, the American Medical Association, the American Public Health Association, American Water Works Association, Association of State and Territorial Health Officers, State and Territorial Dental Health Directors and the U. S. Public Health Service. In California the program has been endorsed by the California Medical Association, the State Board of Public Health, the Conference of Local Health Officers, Northern and Southern California Dental Associations, and local dental and medical societies throughout the State.

The Problem of Dental Decay

Dental caries is one of the major public health problems of our Nation, with an estimated 97 percent of the population susceptible to it. It cannot be considered a problem of the dentist alone. In health departments the interest and responsibilities for carrying on a dental health program are shared by the health officer and his entire staff.

With artificial fluoridation of community water supplies, other allies are being brought in to fight this universal problem. Now, control of dental caries through fluoridation of public water supplies calls for the special services of water works and laboratory personnel.

Artificial fluoridation of community water supplies promises to go far in controlling tooth decay. Speaking editorially, the American Journal of Public Health states that: "Evidence is now beyond question that this procedure will eliminate from one-half to two-thirds of the problem of tooth decay." (2) The savings in family dental bills alone will be tremendous.

However, the use of fluorides will not preclude the need for dental care. Proper diet, with low sugar intake, good oral hygiene and regular visits to the family dentist will still be necessary, but fewer fillings will be needed.

Local Health Department's Role

With the introduction of fluorides into public water supplies, a new concept of water treatment appears, which poses new technical and administrative problems for local health departments. Because viewpoints previously applicable may require modification or reorientation in considering this new program, it may be of value to review the present objectives of public utilities in the field of public health.

Delineation of Responsibilities

It has long been recognized that provision of a safe, potable and adequate community water supply is not a normal function of a health department, but of a public or private utility. Present water treatment procedures are directed toward the removal of deleterious bacterial, chemical and vegetable matter from the water supply. While the service is provided by the public or private utility, public health supervision of these operations in California is a function of the Bureau of Sanitary Engineering of the State Department of Public Health and local health departments. Immediate control of the quality of the water supply is the responsibility of the water purveyor, but the local health department is responsible for checking the water supply for its purity and freedom from contamination.

Unlike the above services, the fluoridation process goes beyond the provision of a safe, potable and adequate water supply. It introduces a new community concept, as its aim is to prevent a certain type of dental pathology in the population by the introduction of a chemical substance into the water supply as a preventive therapeutic agent. However, it seems logical to continue the normal administrative, fiscal, and operational pattern of treatment of public water supplies in this newer development. The fluoridation of water supplies, once agreed upon as desirable by the community, its governing body and its official and professional agencies, should be the responsibility of the utility normally charged with water treatment of the community.

Health Department's Contribution

The local health department has a great contribution to make in the establishment of a fluoridation program. Its role is to study the elements of the program, evaluate the scientific dental and medical aspects, make recommendations, and furnish information to the community and the governing body.

Once the program is established, certain added responsibilities will have to be assumed by the health department. Whatever supervision of the community water supply is now exercised by the local health departments should be extended into this new field—such supervision being in conformity with standards set by the State Board of Public Health.

It would appear logical to assume that the cost of fluoridation should not be a charge against the health department's budget any more than the cost of chlorination and other treatment of water, or the cost of pasteurization of milk. Such costs should be borne by the consumer of the product.

Engineering Aspects of Fluoridation

The engineering problems involved in fluoridating water supplies are, in general, not complicated. Fluorides may be added to water by using equipment that has long been used in water works for adding other chemicals to the water supply. However, two aspects of fluoridation differ from normal water works operations:

First, sodium fluoride is a toxic chemical which must be handled with care. Originally at such places as Grand Rapids, Sheboygan, and Newburgh, special clothing and dust respirators were worn by the operators. (3) Experience showed that these extreme precautions were not necessary, but care should be taken to minimize inhalation of dusts and to observe reasonable personal hygiene practices.

The second difference is that the effects of variation in feed are not so serious as with other water works chemicals. For example, a constant feed of chlorine is necessary for the control of contamination. With fluoridation, interruptions in feeding can mean, at most, a loss of protection against dental caries. Overfeeding, even double or more than the recommended dosage, will not produce undesirable results unless such overfeeding continues for periods of many days.

Methods of Adding Fluorides

Fluoridation is accomplished by adding one of the salts of fluorine, commonly either sodium fluoride or sodium silicofluoride. These salts are available in the dry form. At Madison, Wisconsin, hydrofluoric acid solution has been used. (4) Because this acid is highly corrosive, special equipment is necessary.

Fluorides as sodium fluoride or sodium silicofluoride are fed by chemical dry feed machines which feed measured amounts of the dry chemical into a solution pot, from which solutions are introduced into the water system. It is also possible to batch-mix sodium fluoride or sodium silicofluoride solutions and to use a solution feeder to introduce the fluoride into the water system. Acid solutions are fed by chemical solution feeders using a rather intricate mechanical system.

Dry feeders may be "volumetric" or "gravimetric." Feed by volumetric machines is controlled on a volume basis and there is no close measure of the weight of chemical fed into the water system over a period of time, except by assuming that the feed has been uniform, or unless the machine is mounted on scales. Feed by gravimetric mechanisms is controlled on a weight basis and gives, for any particular time interval, more accurate information on the amount of fluorides that have been fed.

Maintaining Fluoride Level

The major objective is to place and operate fluoridation equipment so that the fluoride level will be uniform throughout the distribution system. This will necessitate fluoridating at each source or fluoridating at a point through or past which all the water flows. One exception must be made to the statement on location of equipment. Certain treatment processes such as lime soda softening or alum coagulation will remove part of the fluorides from previously fluoridated water. This apparently is the result of a combination of fluorides with magnesium hydroxide. (5) In such cases either additional fluorides should be added to compensate for the loss in the treatment process, or the addition of fluorides should be after the treatment works.

Sampling to Determine Level

The important element of fluoridation is of course to maintain an optimum level of fluorides in the water delivered to the consumer. Because of the factors that might result in a variable amount of fluoride in the water, either changes in fluorides naturally present or variation in fluoride feed, it is necessary that control tests be performed to determine the level of fluorides in water in the distribution system. This, basically, is the responsibility of the water purveyor. Therefore, the water works operator must carry on sampling and determination of fluorides. In addition to these control tests, it is necessary that check samples be collected and tested at intervals by the local health department as a routine measure of supervision of the water system, much in the same manner that bacteriological check tests are performed by the health department.

Frequency of Sampling

It is not possible at this time to give, without reservation, comments on the frequency of sampling. It seems reasonable that at the beginning of fluoridation treatment, samples should be collected in the distribution system with such frequency and at as many points as is necessary to make certain that the desired results

are occurring. For small water systems perhaps one sample per day from the distribution system will be adequate. For larger systems two or more samples per day may be desirable. Just how long this daily sampling should continue is also an unknown factor. It is likely that after a period of three or four months it will be found that a lesser frequency of sampling is adequate. Thereafter, for smaller systems one or two samples a month may be sufficient, and for larger water systems one or more samples a week may suffice. Check samples by the health department probably should be collected one per month on large systems, one or two per year on small systems, and perhaps on a quarterly basis for intermediate-sized systems.

Methods of Analysis

Many methods for the estimation of fluorides have been advanced, but none has been free from difficulty and criticism. It is generally agreed, however, that colorimetric methods are best adapted to routine analysis of fluoride in water. The colorimetric tests used in the estimation of fluoride depend on its bleaching action on various colored compounds. It was early shown (6) that minute amounts of fluoride caused a hydrochloric acid-zirconium-alizarin mixture to change color from pink to yellow. The degree of fading is proportional to the quantity of fluoride present. The bleaching effect of fluoride on a hematoxylin-aluminum lake is similar. A rapid colorimetric method utilizing the aluminum lake of eriochromecyanine has been proposed (7).

Interference of Ions

It was soon discovered that the ordinary saline constituents in water such as sulfates, chlorides, bicarbonate, calcium and many other ions would interfere with the fading action of fluoride when using the hydrochloric acid-zirconium-alizarin mixture. The interfering action of these ions caused erroneously low results. A mixture of hydrochloric acid and sulfuric acid, when used in combination with the zirconium alizarin reagent eliminated the interference caused by these ions when present within reasonable limits. The American Public Health Association (10) recommends the method of Sanchis (8) as modified by Scott (9) for the estimation of fluoride in water.

This procedure has been found reliable for potable waters of ordinary composition. Up to the following limits the mixed acid-zirconium-alizarin reagent is not interfered by: chloride ion—500 p.p.m., sulfate ion—200 p.p.m., alkalinity (as $CaCO_3$)—200 p.p.m., iron—2 p.p.m., aluminum—0.5 p.p.m., phosphate ion (PO_4^{---})—1 p.p.m., color—25, and turbidity—25. The reagent is fairly stable and if stored in a refrigerator may be used over a period of 60 to 90 days. The procedure is given in Standard Methods (10) consists of adding an accurately measured volume of the acid-zirconium-alizarin reagent to a given volume of water sample, mixing and comparing with standards after standing one hour at room temperature.

When any of the above interfering constituents are present, equivalent quantities may be added to the standards, or the fluoride separated by distillation. If the water is discolored or turbid, distillation of the sample is required. This method (10) has the advantage of concentrating the fluoride, but requires more than ordinary care, and when done by an inexperienced worker, the results may prove disappointing. It is evident, therefore, that before reliance can be placed on the results of a direct test, it is necessary to perform a complete mineral analysis of the water in order to exclude the possibility of interfering ions. These considerations must be borne in mind when contemplating a field test for the estimation of fluoride. Field testing is facilitated by the use of permanent color standards that are commercially available.

Laboratory Control

It is desirable that laboratory control of fluoridation be carried out only by trained people. For this reason analyses should be performed only in laboratories approved for this purpose by the State Department of Public Health. This applies both to control analyses by the water purveyor and to check analyses by the local health department. The State Department of Public Health is prepared to train local health department personnel to perform these analyses if they possess a sound chemical background to competently perform the necessary laboratory work.

Cost of Fluoridation

Many inquiries have been received concerning the cost of fluoridation. Obviously it is difficult to generalize in this regard. Based on experiences in the East, the cost of fluoridation is between 5 cents and 15 cents per capita per year for the entire population; or 25 cents to 75 cents for the child population alone. (2)

The cost of fluoridation is made up of several elements: the cost of the chemical equipment, the cost of chemicals, the cost of supervision, and finally the cost of chemical control tests. As regards cost of equipment, a recent publication (11) presents the following table from *Water Works Engineering*, February, 1951:

Feeder types	*Approximate cost*
Gravimetric, dry	$2,500-$5,000
Volumetric, dry	700- 2,500
Liquid (hypochlorinator)	500- 1,000

As many pieces of equipment are needed as there are to be points of application of fluorides.

Current information concerning the cost of chemicals is that sodium fluoride in 375-pound drums costs

about 13 cents per pound, and sodium silicofluoride will cost approximately 9 cents per pound. Experience is that cost of these chemicals is increasing.

The cost of supervision is something that each water works operator must estimate for himself, and no generalization is of real value. The cost of chemical control analyses cannot be easily approximated either. It is likely that if analyses must be run in commercial laboratories, they may cost several dollars per analysis, whereas if they are run in a water works laboratory, the cost might be something less than a dollar per analysis, if additional personnel do not have to be hired.

No Undesirable Side Effects

A few words about side effects are desirable. There are no noticeable effects of 1 p.p.m. fluoride on taste, odor, color, hardness, or pH value. There are no known reactions between fluorides at 1 p.p.m. in water and compounds formed in water after chlorination. Fluorides at this concentration have no bactericidal effects. Home softening units using the salt regeneration system will not remove added fluorides. No undesirable effects have been reported by bottlers, brewers, bakeries, laundries, or chemical plants. At Charlotte, North Carolina, cracking of ice blocks in ice manufacturing plants increased after fluoridation of the community water supply. This difficulty was completely eliminated by adding ammonium chloride to the water used for ice making. No other such experience has been reported (12).

In compliance with the September 4, 1950, statement of the State Board of Public Health (13), it is necessary that details for accomplishing fluoridation be reviewed in each instance by the State Department of Public Health. This may be accomplished by making application to the State Board of Public Health for permit to provide the required treatment. This application should be supported by full details of the proposed installation. Those places having an acceptable plan will be granted permit for the fluoridation treatment by the State Board of Public Health.

BIBLIOGRAPHY

1. "Fluoridation in the Prevention of Dental Caries." *Council on Dental Health:* A. D. A., Chicago (1951).
2. Editorial, "What Are We Waiting For," *American Journal of Public Health* (Feb., 1951), Vol. 41, No. 2, 224-26.
3. Zufelt, J. C. *Water & Sewage Works Magazine* (Feb., 1948), 57-60.
4. Smith, L. A., "Experience with Fluoridation of Drinking Water," *Journal American Water Works Association*, Madison, 42:844 (Sept., 1950).
5. Scott, et al., "Fluoride in Ohio Water Supplies," *Journal American Water Works Association* (Jan., 1937), 29:9.
6. DeBoer, J. H. *Chem. Weekblad* (1924), Vol. 21, 404.
7. Thurn, W. E., "Rapid Methods for Determining Fluoride in Waters," *Analytical Chemistry* (1950), Vol. 22, 918.
8. Sanchis, J. M., "Determination of Fluorides in Natural Water," *Ind. Eng. Chem., Analy. Ed.* (1934), Vol. 6, 134.
9. Scott, R. D., "Modification of the Fluoride Determination," *Journal American Water Works Association* (1941), Vol. 33, 2018.
10. *Standard Methods for the Examination of Water and Sewage*, 9th Edition (1946), 77.
11. *Water Works Engineering Magazine* (Feb., 1951), Anon., 142.
12. Maier, F. J., "Fluoridation of Public Water Supplies," *Journal American Water Works Association* (Dec., 1950), 42:1120.
13. Halverson, Wilton L., M.D., *Memorandum* to all local health officers in California (Sept. 4, 1950).

Joint Committee on School Health Elects Dr. Kelley Chairman

Dr. Elizabeth Kelley, Professor of Health Education, Fresno State College, was elected chairman of the State Joint Committee on School Health, representing the State Department of Education, at the March meeting of the committee. Dr. Anita E. Faverman, Chief, Bureau of Maternal and Child Health, State Department of Public Health, was elected secretary. The new officers will serve a term of two years.

The State Joint Committee is composed of staff of the Departments of Education and Public Health. Studies are conducted by committees which include on their membership staff of local school and health departments, representatives of professional societies and voluntary agencies. On the basis of reports by study committees, the State Joint Committee makes recommendations on policy and program to directors of the two state departments.

Among topics which currently are being considered by study committees are the following: school facilities for children's rest, school lunch and nutrition programs, dental health instruction materials, hearing testing.

The committee voted to endorse the program for fluoridation of public water supplies, which has been endorsed by the State Dental Societies, the California Medical Association, the State Department of Public Health and the Conference of Local Health Officers. Research has shown that the addition of fluoride to the water supply will reduce the incidence of dental caries from 40 to 70 percent.

Public Health Report Issued

The Forty-Second Report of the California State Department of Public Health, covering activities for the Fiscal Year 1949-1950, is now available. The 120-page narrative report includes a brief historical review of public health in California during the past century. The report will be followed by a Statistical Supplement to be issued within three or four months. Initial distribution of the new report is being made. Additional single copies may be obtained from the Bureau of Health Education, 760 Market Street, San Francisco 2.

Bay Area Sanitation Directors Organize, Elect Officers

Formation of a conference of Bay Area Directors of Environmental Sanitation is announced by Charles B. Ruegnitz, Director of Sanitation for the Alameda County Health Department, and newly elected chairman of the conference. Sanitation directors of 10 Bay area health departments were present at the organizational meeting held during March in Alameda County. The group will hold monthly luncheon conferences, the next being scheduled for April 26th in San Jose.

Purposes and aims of the new organization are stated as follows:

To correlate activities of the various divisions of environmental sanitation so that there will be a uniformity in the interpretation and enforcement of laws;

To correlate and coordinate activities in civil defense;

To refer, with approval of health officers in the respective departments represented, matters on environmental sanitation to the Conference of Local Health Officers, and

To engender a spirit of fellowship among directors.

Serving with Chairman Ruegnitz as vice chairman during the current six months is Sidney F. Dommes, Jr., Director, Division of Environmental Sanitation, Oakland City Health Department.

Change of Address

City of Long Beach—With completion of its new health center, the Long Beach Department of Public Health has moved from 218 E. First Street to 2655 Pine Avenue, Long Beach.

Napa County Health Department—Mailing address has been changed from 290 Monroe Street, Napa, to P. O. Box 749, Napa. There has been no change in quarters.

Botulism Outbreaks Since 1910 Tabulated for State

In view of the recent interest in four separate outbreaks of botulism in California, in which seven cases were reported with two deaths, the following tabulations of outbreaks recorded in this State since 1910 are given. Table 1 provides a breakdown by 10-year periods; Table 2 gives a picture of reported cases since 1940 according to probable source.

The last two cases reported which are not included in the tables below, occurred in one family in Butte County with one death. The investigation as to source had not been completed at this writing.

A review by the Bureau of Acute Communicable Diseases of botulism outbreaks reported since 1940 (Table 2) indicates that 87 percent of all cases and 90 percent of the deaths recorded had their source traced to home-canned foods.

California provides continuous state supervision, through the State Department of Public Health, in canneries processing nonacid and other foods in which botulism is a hazard. This service is also provided for community canning centers.

Table 1—Botulism in California Outbreaks, Cases and Deaths 1910-1951

Year	Number outbreaks	Number cases	Number deaths
1910-19	33	104	71
1920-29	47	87	54
1930-39	50	105	58
1940-49	51	109	64
1950 through February, 1951	6	12	4
Totals	187	417	251

SOURCES OF DATA: Morbidity reports, California Department of Public Health; and "Fifty Years of Botulism in the United States and Canada," K. F. Meyer, M.D. and B. Eddie, Dr. P. H., George Williams Hooper Foundation, University of California Medical Center, San Francisco, July, 1950.

Table 2—Reported Cases of Botulism in California January, 1940, to March, 1951

Probable source	Outbreaks	Cases	Deaths
A. Home processed food	48	105	61
1. Vegetables	36	77	46
Beets and beet greens	9	19	9
Asparagus	5	9	6
Chili peppers	4	11	7
String beans	5	8	5
Tomatoes	3	10	4
Mushrooms	2	4	1
Other (corn, spinach, beans, par-par)	8	16	14
2. Fruits	6	12	6
Figs	3	5	4
Apricots	1	3	0
Pears	1	2	1
Cactus	1	2	1
3. Meat or fish	4	10	4
Ham (cured in deep brine)	1	3	2
Pigs feet	1	2	2
Lamb stew	1	1	0
Salmon	1	4	0
4. Pickles or other relish	2	6	5
Dill pickles	1	4	3
Mixed vegetable relish	1	2	2
B. Commercially processed food	3	5	3
Bologna	1	1	1
Mushroom sauce	1	3	1
Liederkranz cheese in jars	1	1	1
C. Wound infection (buzz saw wound)	1	1	1
D. Source undetermined	5	10	3
Totals	57	121	68

Health councils * * * promote the efficient operation of public health work through the coordination of health activities within the area served—whether they are local, community, state, or national—by eliminating duplication of effort and by stimulating new and needed services.—*Today's Health*, March, 1951.

San Francisco Civil Service Exams

Continuing monthly examinations for the positions listed below are announced by the San Francisco Civil Service Commission. Monthly salary ranges are based on a 5-day, 40-hour week unless otherwise noted. Unless stated, residence requirements have been waived. Further information may be obtained from the San Francisco Civil Service Commission, Room 154, City Hall, San Francisco.

Public Health Nurse—$260-$320. No written or oral test will be given. Applicants' qualifications will be judged and rated by the Civil Service Commission from a review and evaluation of their experience and training. Applicants must possess a certificate as a public health nurse in California.

Registered Nurse—Salary range is $230-$270 for a 5-day, 40-hour week; $253-$297 for a 5½-day, 44-hour week; and $276-$324 for a 6-day, 48-hour week. No written or oral test will be given. Applicants must possess a valid certificate as a registered nurse issued by the State of California.

Operating Room Nurse—Salary range is $288-$360 for a 6-day, 48-hour week. Applicants must be registered nurses, with six months' experience as an operating room nurse. No tests will be given.

Special Nurse—Salary, $11 per day, plus $1.10 for communicable and violent cases, and $5.50 for two patients. No tests are required.

Audiometer Technician—$270-$330. Applicants must possess a current valid certificate as an audiometer technician issued by the California State Board of Public Health.

Clinical Laboratory Technician—$250-$300. Applicants must possess a current valid license as a clinical laboratory technician. No written or oral tests are required.

Assistant Clinical Technician—$240-$280. Must possess valid license as a clinical laboratory technician.

X-ray Technician—$230-$280. Applicants must have had six months of paid experience as an X-ray technician within the past five years.

Dietitian—$230-$280. Applicants must have university or college degree with major work in dietetics, and one year's experience as a hospital or institutional dietitian. Hospital dietetic internship may be substituted for the experience.

Napa PHN Positions

Dr. K. W. Haworth, Napa County Health Officer, announces staff vacancies for two public health nurses. Salary is $3,600 per year, plus travel of 8 cents per mile. The job carries 15 working days' vacation.

W. H. O. Invites Dr. Zimmerman To Serve on Expert Panel

Dr. Kent A. Zimmerman, Chief, Mental Health Service, State Department of Public Health, has been invited by the World Health Organization to become a member of its expert Advisory Panel on Mental Health. In the past few months W. H. O. has established expert advisory panels in the various health fields, discontinuing expert committees. Panel members carry the responsibility of keeping W. H. O. informed as to activities in their areas, and are available to W. H. O. when matters in their respective specialties appear on the agenda for attention.

Dr. Zimmerman has served W. H. O. as a member of the expert committee on Mental Health, and attended the W. H. O. Assembly meeting in Geneva last year.

National Hearing Week, May 6-12

"Hearing Is Priceless—Protect It!" is the theme for National Hearing Week, May 6th to 12th, an observance sponsored by the American Hearing Society in cooperation with 115 local chapters throughout the Nation. The week directs attention to an estimated 15,000,000 persons in America who have some degree of hearing loss. Of this number approximately 3,000,000 are children.

The National Hearing Society was organized in 1919 with the objectives of prevention of deafness, conservation of hearing, and rehabilitation of the hard of hearing. The society has sponsored a national hearing week annually since 1927.

N. P. C. Publishes Manual on Public Relations

Good planning is the key to a successful public relations program, but until now little material on the who, what, why and how of public relations planning has been available to guide staffs and boards of community-serving organizations. "Public Relations Programs—How to Plan Them," newest how-to-do-it manual from the National Publicity Council for Health and Welfare Services, helps fill that gap in the reference bookshelf on public relations.

Written by Sallie E. Bright, executive director of N. P. C., the manual makes a penetrating analysis of the nine basic elements in planning toward a two-way partnership between the public and a social service, health, educational, recreational or civic organization. Of particular value are the many practical suggestions on planning methods which any organization, however limited in staff and funds, can put to use.

The 44-page manual is available for $1 from N. P. C., 257 Fourth Avenue, New York 10.

Department of Industrial Relations Has Publications of PH Interest

Several publications of the State Department of Industrial Relations which have direct public health interest are available to public health workers and related groups for the asking. These publications are listed as follows:

California Safety News, published quarterly by the State of California Department of Industrial Relations, Division of Industrial Safety, 965 Mission Street, San Francisco 3; 357 S. Hill Street, Los Angeles 13. Mailed free of charge.

Work Injuries in California, a monthly statistical report published by the State of California Department of Industrial Relations, Division of Labor Statistics and Research, 965 Mission Street, San Francisco 3. Mailed free of charge.

Health Plans, Life Insurance, and Pensions in California Union Agreements, published by the Division of Labor Statistics and Research, 965 Mission Street, San Francisco 3. A letter to Mr. M. I. Gershenson, Chief, will obtain a complete list of the division publications.

California Labor Statistics Bulletin, published monthly by State of California Department of Industrial Relations, Division of Labor Statistics and Research, 965 Mission Street, San Francisco 3.

School Lunches

During the 1949-50 school year more than 40,000,000 Type A meals and 30,000,000 Type C meals (milk only) were served in California schools, according to Mr. James M. Hemphill, State Supervisor of the School Lunch Program in the office of Mr. Roy E. Simpson, State Superintendent of Public Instruction. Total program expenditures approximated $22,000,000, with almost $3,000,000 being spent for milk alone. A program of this size, to maintain minimum meal standards, takes 800,000 pounds of butter, 4,375,000 gallons of milk, and 5,000,000 pounds of meat, fish, poultry or cheese.

Civil Defense Administrators Named

Colonel William L. Wilson, former Special Assistant to the Surgeon General of the United States Army for Civil Health Affairs, has been appointed Assistant Administrator for Health and Welfare of the Civil Defense Administration.

Directing the Health Services and Special Weapons Division under Col. Wilson will be Dr. Norvin C. Kiefer, former Director of the Health Resources Office of the National Security Resources Board.

California Morbidity Report February, 1951

Civilian Cases

Reportable diseases	Week ending 2/10	2/17	2/24	3/3	Total cases Feb.	5-yr. median Feb., 1946-1950	Total cases Jan.-Feb., inc.
Amebiasis	18	11	7	6	42	19	101
Anthrax	1	----	----	1	2	----	3
Botulism	1	----	----	----	1	----	4
Brucellosis (undulant fever)	2	1	----	----	3	7	8
Chancroid	5	12	10	5	32	38	73
Chickenpox	1,288	1,091	1,267	1,235	4,881	4,412	9,479
Cholera	----	----	----	----	----	----	----
Coccidioidomycosis, disseminated	----	1	----	1	2	5	7
Conjunctivitis, acute infectious of the newborn	1	----	----	----	1	2	1
Dengue	----	----	----	----	----	----	----
Diarrhea of the newborn	----	----	----	----	----	6	11
Diphtheria	7	8	5	3	23	63	51
Encephalitis, infectious	1	2	1	1	5	5	10
Epilepsy	25	24	39	33	121	144	253
Food poisoning	----	----	----	----	----	25	3
German measles	136	89	161	153	539	249	951
Gonococcus infection	320	279	303	304	1,206	1,916	2,955
Granuloma inguinale	----	----	1	----	1	4	1
Hepatitis, infectious	10	3	4	12	29	20	53
Influenza, epidemic	136	194	117	236	683	163	747
Leprosy	----	----	----	----	----	1	----
Leptospirosis (Weil's disease)	----	----	----	----	----	----	----
Lymphogranuloma venereum	5	1	4	----	10	18	23
Malaria	----	----	----	----	----	4	----
Measles	1,334	1,160	1,659	1,948	6,101	3,266	9,726
Meningitis, meningococcal	9	8	8	18	43	43	81
Mumps	428	347	530	475	1,780	2,324	3,924
Pertussis	64	52	42	41	199	406	455
Plague	----	----	----	----	----	----	----
Pneumonia, infectious	46	47	54	89	236	227	437
Poliomyelitis, acute anterior	29	8	15	25	77	50	250
Psittacosis	----	----	----	----	----	1	1
Rabies, animal	1	1	----	1	3	21	13
Rabies, human	----	----	----	----	----	----	----
Relapsing fever	----	----	----	----	----	----	----
Rheumatic fever, acute	5	5	4	10	24	62	56
Rocky Mountain spotted fever	----	----	----	----	----	----	----
Salmonella infections*	2	3	6	3	14	2	50
Shigella infections (bacillary dysentery)	18	3	3	13	37	21	98
Smallpox	----	----	----	----	----	----	----
Streptococcal infections respiratory, including scarlet fever	273	182	229	269	953	648	1,971
Syphilis	195	160	212	194	761	1,323	1,729
Tetanus	----	1	1	----	2	2	3
Trachoma	----	----	----	----	----	----	3
Trichinosis	1	----	----	----	1	----	2
Tuberculosis:							
Respiratory	155	155	143	195	648	612	1,434
Other forms	6	8	6	5	25	32	71
Tularemia	----	----	----	----	----	----	----
Typhoid fever	1	1	----	----	2	9	8
Typhus fever	----	----	----	----	----	----	----
Yellow fever	----	----	----	----	----	----	----
					18,487		35,063

* All types of salmonella infection now reportable. Prior to January 1, 1950, only A, B and C types were reportable, hence five-year median not entirely comparable.

Health can be bought by local government at a lower price than is paid for many of the so-called necessities and satisfactions of life or for such luxuries as alcohol, tobacco, chewing gum, cosmetics, or self-medication with useless or harmful medicines.—*Haven Emerson.*

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